U.S. Application No.: 10/535,157
Amendment C
Reply to Office Action Dated February 20, 2008

Attorney Docket No: 3926.150

## REMARKS

Status of Claims

Claims 3 and 8 were previously canceled.

Claims 1-2, 4-7 and 9-10 are pending in the application.

Claim 1 has been amended to more clearly define that the method involves

- limiting the perception region to a lane and a tolerance region next to said lane, and further dividing this into a plurality of component regions,

- detecting objects,

- classifying objects as to relevance, based on location (which component region) and recognized type of object,

- based on the results, classifying component regions as to relevance, and

- carrying out a type of evaluation (e.g., using different computing capabilities, for example complex, multi-stage algorithms) based on the assigned relevance of each component region (prioritization allows higher interest areas to be processed first or more often, and dividing regions into lane and tolerance regions next to the lane allows a more intelligent analysis based on expected objects to be recognized (vehicles vs. pedestrians), thereby synergistically optimizing computer resources and speed), and

- issuing a warning to a driver of the road vehicle based on a result of the evaluation.

Support for the amendment of claim 1 can be found in:

Paragraph [00016]:

It is also conceivable to carry out object classification for the purpose of carrying out evaluation in the perception region. In which case the object classification can be used alone or additionally in combination with other methods, predominantly in order to minimize false alarms. In particular in the case of the classification methods which are based on learning from examples it is possible to adapt

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different classifiers for different perception component-regions. Different learning samples are generated for different perception component-regions, in order to adapt the classifiers. In this context, a learning sample for a perception component-region comprises only such patterns whose type of object can also actually appear within the perception component-region. For example, traffic signs do not appear within the lane but rather at the edge of the lane. The scaling for a pattern of a learning sample within a perception component-region can also be satisfactorily predicted so that the number of patterns may be small

Paragraph [00017]:

> For example, on the basis of a classification it is possible to check an object there detected by means of image processing to determine whether the object is actually an obstacle or another object which can usually appear within a traffic scene and does not constitute a danger, for example oncoming traffic.

And Paragraph [00019]:

> For the detection of objects it is possible to use a combination of distance measuring and speed measuring methods as well as classifying methods. By using tracking methods it is possible to carry out an evaluation in the perception region in such a way that both the direction of movement and the speed of movement of objects can be sensed. In particular, methods with which differences in the lateral movement can be satisfactorily perceived are used. For example, obstacles which suddenly appear or vehicles which move out are indicated to the driver.

Thus, the improvement in utilization of computer resources and in early issuance of warning to the vehicle operator achieved in accordance with the present invention is synergistically enhanced by the combination of (a) the intelligent searching for specific search objects in specific areas, and (b) the classification of areas as to priority of interest.

Claim 10 remains unchanged and differs from claim 1 in that in claim 10 priority is pre-assigned, e.g., to be higher in the nearer component regions, in contrast to claim 1 where priority is assigned based on the results of the object search.

Accordingly, entry and consideration of the amendments is respectfully requested.

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## Detailed Action

Turning now to the detailed action, the paragraphing of the Examiner is adopted.

Response to Amendment

The Examiner indicates that the cited art teaches a tolerance region, thus Applicants can not use this feature to distinguish over the prior art.

In response, Applicants point out that the tolerance region is merely one factor used in optimizing the speed and accuracy of hazard recognition according to the present method. The other factor is the dividing of the classification of limiting the perception region to a lane and a tolerance region next to said lane, and further dividing into a plurality of component regions,

- detecting objects,

- classifying objects as to relevance, based on location (which component region) and recognized type of object, and based thereon,

- classifying component regions as to relevance, and

- carrying out a type of evaluation (e.g., using different computing capabilities, for example complex, multi-stage algorithms) based on the assigned relevance of each component region (prioritization allows higher interest areas to be processed first or more often, and dividing regions into lane and tolerance regions next to the lane allows a more intelligent analysis based on expected objects to be recognized (vehicles vs. pedestrians), thereby synergistically optimizing computer resources and speed), and

- issuing a warning to a driver of the road vehicle based on a result of the evaluation.

Claim Objection - §112

Claim 1 is objected to.

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Applicants have amended the second occurrence of "a surroundings sensor" to "a surroundings sensor" as correctly understood by the Examiner.

Regarding "component regions", Applicants have amended claim 1 to clarify that each component region receives a priority classification based on objects recognized therein, i.e., to recite: "subjecting each of the plurality of component regions to a ~~multi-stage~~ prioritized evaluation based on the evaluation priority assigned to each ~~the~~ component region ~~regions~~, and ". Support for the amendment can be found in the specification, paragraph [00011] as discussed below.

Claim Rejection - §112

Claim 1 is rejected for lack of support in the specification as filed for the limitation of assigning a priority to each component region.

In response, Applicants respectfully submit that this limitation finds support at the end of paragraph [00011] of the specification, which recites that different component regions may have different priority, and that different types of computation can be applied on the basis of priority:

> The perception region is divided according to the invention into a plurality of
> component-regions. Owing to the division into such perception component-
> regions it is then possible to subject surroundings data to a specific evaluation.
> For example, the evaluation is carried out with a higher priority in a near region
> than in a more distant region. It is also conceivable to make different computing
> capabilities, for example complex, multi-stage algorithms, available for different
> perception regions.

Further, in Paragraph [00016]:

> It is also conceivable to carry out object classification for the purpose of carrying
> out evaluation in the perception region.

And in Paragraph [00022]:

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> The perception region is also intended to be divided into a plurality of
> component-regions (A...D) in order to subject the surroundings data to a
> multi-stage evaluation.

Finally, original claim 1 recited that the perception region is divided into a plurality of
component-regions and each of these component-regions is subjected to a specific evaluation.
Claim 4 recited that for the purpose of carrying out evaluation in the perception region, object
perception is carried out by means of image processing methods. And Claim 7 recited that for the
purpose of carrying out evaluation in the perception region by means of tracking methods, the
movement of objects is sensed in order to perceive whether their direction of movement
corresponds to the vehicle's own movement

The above sections and claims teach that the evaluation to which a particular perception
component region is subjected depends upon the priority assigned to it.  Different perception
regions may then be provided different computing capabilities, e.g., complex computing
capability where appropriate.  Applicants also not that the original German language application
uses the term "unterschiedliche" which was translated into "specific".  However, a more correct
translation would have been "different" or "discriminative" or "varied" or "diverse".
Accordingly, for conformity with the original German text (filed on same date as application,
and therefore not constituting new matter), Applicants amend "specific" to "different".

Entry of the amendment and withdrawal of the rejection is respectfully requested.


Claim Rejections of Record - 35 U.S.C. § 103

Claims 1-2, and 10  are rejected under 35 USC 103(a) as being unpatentable over
US20030222812A1 (Kishida) in view of in view of Nishigaki et al. (US 6,775,395), Maekawa (
US 5,530,77') and Morcom WO 02/082201).

Applicants respectfully traverse.

Kishida disclosed is a method of storing data for temporarily storing a plurality of
detected data in a data buffer or the like included in a radar used for a vehicle. The radar detects

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signals reflected from a plurality of target objects so as to obtain a plurality of detected data, and

detects the presence of the plurality of target objects on the basis of the plurality of detected data.

According to the above method, when a plurality of detected data, which has been detected by

the radar, is temporarily stored in a data storage unit, priorities are assigned to the plurality of

detected data, depending on whether target objects associated with the plurality of detected data

are moving target objects or static target objects, or depending on whether or not the target

objects are target objects located in closer position to a moving vehicle, or depending on whether

or not the target objects are target objects located in a lane in which the moving vehicle is

traveling, or depending on whether or not the target objects are target objects in which a

probability of the presence is higher.

The present invention achieves safety not by assigning priority to any detected object, but

by prioritizing different component regions based on objects detected in the regions. This saves

on computation resources by not requiring scanning and processing of the entire scanned area

with equal scrutiny, but by focusing scanning and computer resources on zones in which objects

are detected.

The Examiner refers to paragraphs [00013] and [00042] of Kishida but these pragraphs

merely (a) give higher priority to the detected data associated with an object in the lane as

opposed to outside the lane, and (b) change scanning angle based on a control signal, but this

does not teach or suggest prioritization of component regions.

Paragraph [00046] cited by the Examiner refers to assignment of priorities to detected

data, but does not teach prioritization of zones or component regions of interest.

Withdrawal of the rejection is requested based upon the clarification of claim 1, and the

argument that claim 10 pre-assigns priority to different scanned zones or component regions,

which Kishida does not teach.

Next, Nishigaki et al is cited for teaching that **tolerances** are often included in

engineering applications.

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As discussed in present paragraph [00016], "For example, traffic signs do not appear within the lane but rather at the edge of the lane." By dividing the perception region into component regions including a lane, where vehicles are expected to be seen but not traffic signs, and a "**tolerance region**" beside the lane where, e.g., traffic signs are expected to be seen, object recognition techniques such as, edge matching, etc can be carried out to look for signs in the tolerance region rather than in the lane region.

As set forth in paragraph [00014] "As a result, objects which are located at the edge of the road, such as road signs, persons, etc. can be sensed within the perception component-regions and thus evaluated specifically with respect to the individual component-regions."

Thus, the present invention is based on

(a)    prioritization, to allow higher interest areas to be processed first or more often, and

(b)    dividing regions into lane and tolerance regions next to the lane to allow a more intelligent analysis based on expected objects to be recognized (e.g., vehicles or obstacles in lane vs. traffic signs or pedestrians next to the lane).

This is nowhere disclosed or suggested in Nishigaki et al.

For what is missing in Nishigaki et al., the Examiner cites Maekawa.

However, Applicants maintain that the essence of the present invention is in prioritization of zones or component regions of the sensed area. The advantages of doing this are not taught in or obvious over this combination of references.

Morcom is cited for teaching issuance of a warning to a vehicle operator.

Applicants maintain that the essence of the present invention is in prioritization of zones or component regions of the sensed area. The advantages of doing this are not taught in or obvious over this combination of references.

Regarding rejection of claim 2, of claims 4-6 and 9, of claims 4-5, of claim 6, of claim 9, and of claim 7 over various references, Applicants respectfully submit that these are allowable by virtue of their dependency from allowable claim 1, and maintain that the essence of the
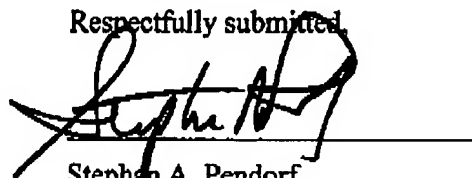
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present invention is in prioritization of zones or component regions of the sensed area. The advantages of doing this are not taught in or obvious over this combination of references.

Favorable consideration and early issuance of the Notice of Allowance are respectfully requested. **Should further issues remain prior to allowance, the Examiner is respectfully requested to contact the undersigned at the indicated telephone number.**

Respectfully submitted,

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Date: July 21, 2008

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